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Nota di contenuto	1. Introduction -- 1.1 History of distance learning and concept of virtual lab -- 1.2 What is virtual lab? -- 1.3 Analysis of the project requirements -- 1.4 Learning theory and its influence on role design -- 1.5 System architecture -- 1.6 Model hierarchy -- 1.7 Web user interface -- 1.8 Questions -- 2. LabVIEW basics -- 2.1 LabVIEW introduction -- 2.2 G-language -- 2.3 Front panel -- 2.4 Block diagram -- 2.5 LabVIEW palettes -- 2.6 Programming with LabVIEW -- 2.7 Programming structures -- 2.8 Data acquisition with LabVIEW -- 2.9 Questions -- 3. Hardware: Armfield Heat Exchanger and Service Unit -- 3.1 Operating HT30XC using customer-generated software -- 3.2 USB interface driver function calls -- 3.3 LabVIEW data logger -- 4. Design of LabVIEW VI program -- 4.1 Software: algorithm of the program -- 4.2 Introduction of LabVIEW controls used in the project -- 4.3 Design of front panel -- 4.4 Design of block diagram -- 4.5 How were the PID parameters' values derived for temperature control? -- 4.6 Questions -- 5. Experiments -- 5.1 How to perform an experiment using the LabVIEW interface? -- 5.2 How would a student access the experiment over the internet? -- 5.3 Experiment results -- 6. Factors influencing the virtual lab -- 6.1 Drivers for programmable devices -- 6.2 Concurrent requirements for same experiment -- 6.3

Sommario/riassunto

Laboratory experiments are a vital part of engineering education, which historically were considered impractical for distance learning. In view of this, the proposed book presents a guide for the practical employment of a heat transfer virtual lab for students and engineers. The main objective of our virtual lab is to design and implement a real-time, robust, and scalable software system that provides easy access to lab equipment anytime and anywhere over the Internet. We have combined Internet capabilities with traditional laboratory exercises to create an efficient environment to carry out interactive, online lab experiments. Thus, the virtual lab can be used from a remote location as a part of a distance learning strategy. Our system is based on client-server architecture. The client is a general purpose java-enabled web-browser (e.g. Internet Explorer, Firefox, Chrome, Opera, etc.) which communicates with the server and the experimental setup. The client can communicate with the server and the experimental setup in two ways: either by means of a web browser, which runs a dedicated CGI (Common Gateway Interface) script in the server, or using the LabVIEW Player, which can be downloaded and installed for free. In both cases, the client will be capable of executing VIs (Virtual Instruments) specifically developed for the experiment in question, providing the user with great ability to control the remote instrument and to receive and present the desired experimental data. Examples of this system for several particular experiments are described in detail in the book.